

Calendar

Friday, Feb. 6
3:30 p.m.
DIRECTOR'S COFFEE
BREAK - 2nd Flr X-Over
4 p.m.
[Joint Experimental-Theoretical Physics Seminar](#) - One West

Speaker: George W.S. Hou,
National Taiwan University,
Taipei
Title: CP Violation for the
Heaven and the Earth

Sunday, Feb. 8
2:30 p.m.
[Gallery Chamber Series](#) - 2nd
Flr Art Gallery
Artist: Waller/Maxwell Guitar
Duo
Tickets: \$15

Monday, Feb. 9
2:30 p.m.
[Particle Astrophysics Seminar](#)
- Curia II
Speaker: Cyril Pitrou,
University of Oslo
Title: The Non-Linear Evolution
of the Cosmic Microwave
Background
3:30 p.m.
DIRECTOR'S COFFEE
BREAK - 2nd Flr X-Over
4 p.m.
All Experimenters' Meeting -
Curia II
Special Topics: Chamonix LHC
Workshop, CDF Luminosity
Studies

[Click here](#) for NALCAL,
a weekly calendar with
links to additional
information.

Weather



Sunny
38°/36°

[Extended Forecast](#)
[Weather at Fermilab](#)

Current Security Status

Feature

GammeV: The little experiment with big output

Call them the Energizer bunny of particle physics: the GammeV collaboration reins in costs, works fast and just keeps going, and going ...

The collaboration of 10 people formed in April 2007 to look for candidates for dark matter and dark energy. Although several members work on other experiments as well, they were drawn to GammeV's unique attributes. Its small collaboration size allows for large individual roles in building and analysis plus a chance to search for exotic particles while exploring areas of physics often overlooked by larger collaborations.

By scrounging parts, including an AD laser, a Tevatron dipole magnet and QuarkNet circuit boards, from old experiments, the collaboration kept to a budget of \$30,000. The collaboration took less than a year to propose, build and publish results from its [first experiment](#) setting new exclusion limits on axion-like particles in the [milli-eV mass range](#).

The collaboration tweaked its equipment and produced in less than a year another set of results, this time on the chameleon particle. (See adjacent Result of the Week)

But the physicists aren't ready to rest yet. Next on the agenda is a possible proposal to upgrade the chameleon experiment during the next year. Once again the experiment would carry a discounted price tag by taking advantage of the old equipment with a few internal modifications, mainly to the vacuum pump system, and another recycled magnet.

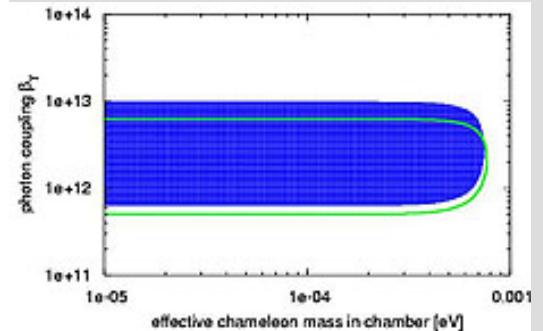
The first chameleon search looked at exclusion plots on "fringe or extreme" models of chameleon particles as dark-energy candidates. The second experiment is expected to probe exclusion plots for a much wider range of models.

How will the collaboration follow that up? Members hope to eventually undertake an upgrade of their original axion study, but that would require a much larger budget and encompass three to five years of work.

-- Tona Kunz

Fermilab Special Result of the Week

A probe of the particle nature of dark energy



The image shows the region excluded at the 99.5 percent confidence level by the GammeV chameleon search. The vertical axis is the chameleon/photon coupling constant and the horizontal axis is the effective chameleon mass inside the vacuum chamber. The solid blue region is for scalar chameleons while the outline region is for pseudoscalar chameleon particles.

The GammeV collaboration has wrapped up the second component of their experimental suite; a test of chameleon dark energy. This is the first dedicated-laboratory test of a dark-energy model, and it is a test that fits on the top of a table (albeit a long, narrow one).

These results, appearing in the Jan. 23 issue of *Physical Review Letters*, come on the heels of the GammeV search for axion-like particles. That result was published in *PRL* last year (PRL 100 080402) and in *Fermilab Today*.

In the chameleon dark-energy model, the observed acceleration of the universe is caused by a light, spin-zero particle that evades other experiments. This evasion is due to the fact that the properties of the hypothetical chameleon particle---namely its mass---depend upon the environment, hence the chameleon moniker. GammeV collaborators exploit this effect to trap these chameleon particles in a jar-like vacuum chamber.

Collaborators generate chameleon particles by interacting polarized laser light with a magnetic field. Some of the photons oscillate into chameleon particles, which pass through the jar but bounce off of the walls of the vacuum chamber---including the optical windows at each end. When the laser is

[Secon Level 3](#)[Wilson Hall Cafe](#)

Friday, Feb. 6

- Old fashioned ham & bean
- Philly style chicken
- Chicken pot pie
- Smart cuisine: baked fish over rice
- Roasted veggie & provolone panini
- Assorted sliced pizza
- Baked potatoes

[Wilson Hall Cafe Menu](#)[Chez Leon](#)

Wednesday, Feb. 11

Lunch

- Raspberry chicken
- Spaghetti squash w/ green onions
- Steamed green beans
- Mocha cake

Thursday, Feb. 12

Valentines Dinner

- Shrimp cocktail
- Chateaubriand with cabernet sauvignon sauce
- Crispy potato torte
- Green bean & blue cheese gratin
- White chocolate-raspberry
- Crème brulee

[Chez Leon Menu](#)

Call x3524 to make your reservation.

[Archives](#)[Fermilab Today](#)[Result of the Week](#)[Safety Tip of the Week](#)[ILC NewsLine](#)[Info](#)[Feature](#)**DOE releases laboratory report cards**

In Fiscal Year 2006, the Office of Science (SC) instituted a new process for evaluating the scientific, technological, management and operational performance of the contractors who run its ten national laboratories. Many attributes of this new laboratory appraisal methodology were the result of recommendations of a committee of Office of Science senior managers who undertook an extensive review of the strengths and weaknesses of the previous process.

[Read more](#) about the grading process.

[View](#) Fermilab's FY2008 laboratory performance report card.

[Photo of the Day](#)**Winter hawk**

TD's Lucy Litvinenko took this photo of a red-tailed hawk in a wintery scene on Power Line Road, just past the Road B intersection last week.

[Announcement](#)**New User's Office Web site an information hub**

The new User's Office Web site

clearly presents information a User might need to obtain or extend a computing account or Visitor ID badge. It also offers information about B-1 and Visa Waiver visits to the U.S., and includes links to online fillable application forms.

The User's Office proudly announces a new Web site: <http://users.fnal.gov>.

The new site clearly presents information a User might need to obtain or extend a computing account or Visitor ID badge. It also offers information about B-1 and Visa Waiver visits to the U.S., and includes links to online fillable application forms.

turned off, the jar empties as the chameleons reconvert to detectable photons. This afterglow is a telltale signature of the chameleon particle.

Planned alongside the axion-like particle search, the chameleon particle search required only a rearrangement of the components of the apparatus. The GammeV scientists, including two theorists who study chameleon cosmology, worked with the technical staff in the Particle Physics Division and at the Magnet Test Facility to collect the 20 hours of data needed to probe the unexplored landscape of particle dark energy.

While no signal was found, the resulting limits constrain the properties of the chameleon particle, including its coupling to photons and its mass, for a range of chameleon dark-energy models. Moreover, with the lessons learned from this experiment, the GammeV collaboration is designing an upgrade that will probe a significantly broader range of dark-energy models as well as general chameleon, spin-zero field models over a much larger range of the available parameter space. More information about the GammeV experiment can be found at <http://gammev.fnal.gov>.



Top left: Jason Steffen; Center left: Amol Upadhye; Bottom left: Amanda Weltman. Left to right: Jonghee Yoo, Dick Gustafson, Peter Mazur, Al Baumbaugh, Ray Tomlin, Xi Yang, Yilda Irizarry-Valle, Aaron Chou and William Wester.

[Announcement](#)**Wilson Hall HVAC cooling outage Feb. 9-13**

Testing on the HVAC ductwork on floors 1-15 in the northeast corner of Wilson Hall will take place from 4 p.m. to midnight on Monday, Feb. 9 through Friday, Feb. 13. There will not be cooling in the building during the testing. This will affect the entire floors of 1-15. Please contact John Kent, x4753 or Randy Sales, x8031, with any questions.

Fermilab Today is online at:
www.fnal.gov/today/

Send comments and suggestions to:
today@fnal.gov

It also includes a new section, called "Alerts," which offers short articles relating to U.S. immigration processes, laws or other topics that might be of interest to our Users. The new User's Office Web site is the first part of a new online presence for the International Services group. The second part – a new Web site for the Visa Office – will come later this year.

In the News

Obama announces new energy guidelines

From the ***Boston Globe***, Feb. 5, 2009

President Obama announced this afternoon that he is issuing a memorandum directing the Energy Department to come up with new guidelines to increase the efficiency of household appliances.

He said that over 30 years, the new guidelines would save the equivalent of the energy produced by all coal-fired plants for two years.

Obama called the changes "a significant down payment" on a clean energy future, and promoted the alternative energy components of his economic stimulus package.

[Read](#) the full news story.

[Read](#) a transcript of President Obama's address.

[Listen](#) to an audio recording of the address.

In the News

Bringing blue-sky thinking down to earth

From ***New Scientist***, Feb. 4, 2009

Physicists and cosmologists do not tend to seek justification for their expensive experiments by flagging up the great practical benefits that might result. Investigations into the origins and nature of the universe are, quite rightly, considered important enough on their own. Yet blue-sky research often has unexpected outcomes, and they are worth celebrating. If nothing else, they can help bridge the conceptual gap between exotica such as neutrinos and dark matter, and more mundane concerns.

There are plenty of examples to choose from. Researchers at the Main Injector Neutrino Oscillation Search (MINOS) experiment deep inside an old mine in Soudan, Minnesota,

Announcements

Latest Announcements

[2009 Standard mileage reimbursement rate](#)

[NALWO Mardi Gras potluck dinner Feb. 20](#)

[NALWO - Brown Bag Lunch Program - "Australia: Travels in the Land Down Under" - Feb. 24](#)

[English Country Dancing, March 1](#)

[NALWO - Adler Planetarium Trip - March 21](#)

[Argentine Tango class Feb. 18](#)

[Have a safe day!](#)

[Discount tickets: Disney On Ice Presents Worlds of Fantasy](#)

[Daycamp information and registration](#)

[Muscle Toning classes - Feb.3 - 26](#)

[Outlook 2007 New Features class Feb. 26](#)

[Nominations requested for job profiles](#)

[Barn Dance Feb. 8](#)

[Bulgarian Dance Workshop, Feb. 12](#)

[Barn Dance Feb. 15](#)

[Kyuki Do classes - Feb. 16](#)

["Facilitating Meetings That Work" class offered Feb. 16](#)

[Fermilab Blood Drive Feb. 17 & 18](#)

[Discount tickets: Smucker's Stars On Ice - Feb. 21](#)

[Discount tickets: World's Toughest Rodeo presents Toughest Cowboy - Feb. 21](#)

[Child Care program offered March 24](#)

[Conflict Management & Negotiation](#)

recently announced that their detector, which is designed to look for neutrinos, those most elusive of subatomic particles, could also help with weather forecasting. It turns out that the number of particles known as muons picked up by the detector varies according to conditions in the upper atmosphere, which affect the weather lower down.

[Read more](#)

[Skills class offered Apr. 1](#)

[Interpersonal Communication Skills class offered Apr. 8](#)

[Additional Activities](#)

[Submit an announcement](#)